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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,307	09/29/2003	Martin W. Rupich	05770-156002	3889

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EXAMINER

PARKER, FREDERICK JOHN

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 10/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/673,307

Applicant(s)

RUPICH ET AL.

Examiner

Frederick J. Parker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,6,7,9-11,13-24,28,30,31,51-58,66-83 and 86 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,6,7,9-11,13-24,28,30,31,51-58,66-83 and 86 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8-15-06 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1,15,51,69 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- Claims 1,15,51,69 are vague and indefinite because it is unclear what types of defects are intended, i.e. pinholes, cracks, metal or oxide contaminants, lattice displacements, etc.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1,2,6, 9-11, 13-23, 28, 30-31, 51-54, 56, 82-83, and 86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuta et al. (EP 0 277 020, hereafter '020) and further in view of Smith '009.

'020 teaches a method comprising:

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disposing a precursor solution onto a surface of a layer to form a precursor film (p. 3, lines 5-10), the precursor film including, for example, yttrium stearate, barium naphthenate, and copper naphthenate (Example 11); and

treating the precursor film to form YBCO (col. 3, lines 31-40). Chemical reactions inherently proceed by forming intermediates. Therefore, the method must form an intermediate of the YBCO.

'020 does not explicitly teach that the barium or yttrium precursors may be fluoroacetates. However, it does teach on page 2, 37+ that "Any metal compound may be used as long as it gives an oxide upon calcination", and goes on to cite a width variety of examples ranging from organic and inorganic acids to organic alkoxides, chelates, and carboxylates (in the Examples).

'009 teaches that barium and yttrium fluoroacetates (carboxylates) are suitable precursors for the formation of YBCO superconductors, col. 8, 45-49. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used barium fluoroacetate and yttrium fluoroacetate as the particular precursors for Ba and Y oxides of '020 with a reasonable expectation of success and with the expectation of similar results because '009 teaches that they are suitable precursors for the formation of YBCO superconductors. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Specific concentrations of defects are not cited. However, defects are well-known in the art to effect the behavior of a superconductive material, and the Examiner further points out that

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current density of Applicants (page 23, full para. 3) and the prior art (Smith, col. 10, 12-13; Cima Ex. 3,; etc) are essentially the same. Hence similar processes and resultant properties would have been reasonably expected to have similar defect concentrations. When a reference discloses the limitations of a claim except for a property, and the Examiner cannot determine if the reference inherently possesses that property (in this case, defect concentrations), the burden is shifted to Applicant/s, In re Fitzgerald 205 USPQ 594 and MPEP 2112.

Claim 2, 16, 56: The substrate may be treated for 1 hour (p. 3, line 25).

Claims 17-19, 51-54: The solution may contain a Lewis base, such as butanol (Example 11) or amines, such as dimethylamine (p. 2, lines 50-56).

Claim 6, 20-23: The layer may have a thickness of 20 microns (p. 3, lines 33-35).

Claims 9, 15, 82-83, 86: Copper propionate may be used (p. 3, line 40; Example 2).

6. Claims 1-2, 6-7, 13-17, 20-24, 28, 30-31, 51, 56, 58, and 86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (U.S. Patent 6,172,009, hereafter '009) in view of Chen et al. (EP 0 431 813, hereafter '813).

'009 teaches a method comprising:

disposing a precursor solution onto a surface of a layer to form a precursor film, the precursor film including, for example, yttrium trifluoroacetate, barium trifluoroacetate, and copper trifluoroacetate (col. 8, lines 45-53); and

treating the precursor film to form YBCO via an oxyfluoride intermediate (col. 3, lines 36-42).

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'009 does not explicitly teach the use of a copper salt other than the trifluoroacetate.

However, '813 teaches that in combinations of precursors to make YBCO superconductors, the copper precursor may be copper ethylhexanoate with only enough copper TFA to add fluorine to the intermediate.

Specific concentrations of defects are not cited. However, defects are well-known in the art to effect the behavior of a superconductive material, and the Examiner further points out that current density of Applicants (page 23, full para. 3) and the prior art (Smith, col. 10, 12-13; Cima Ex. 3,; etc) are essentially the same. Hence similar processes and resultant properties would have been reasonably expected to have similar defect concentrations. When a reference discloses the limitations of a claim except for a property, and the Examiner cannot determine if the reference inherently possesses that property (in this case, defect concentrations), the burden is shifted to Applicant/s, In re Fitzgerald 205 USPQ 594 and MPEP 2112.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a copper salt such as copper ethylhexanoate in addition to, or in replacement of, the copper trifluoroacetate of '009 with the expectation of similar results because '813 teaches that such combinations are suitable copper precursors for forming YBCO superconductors.

Claims 17, 51: The solvent may be ethers or alcohols (Lewis bases).

Claims 6, 20-23: '009 teaches that the thickness should be greater than 1 micron (col. 10, lines 5-12). '009 does not explicitly teach thicknesses greater than 2 microns. However, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the

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invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a *prima facie* case of obviousness, see *In re Wortheim* 191 USPQ 90.

Claim 7, 24, 58: The critical current density is at least 10^5 A/cm² (Example 2 & col. 5, 6-10 of '009).

Claim 16, 56: '009 does not explicitly teach that the processing time is less than 5 hours. However, col. 19, lines 9-12 indicates that shorter processing times are desired. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the treatment time for the optimum balance of semiconductor properties and processing time.

7. Claims 1-2, 6-7, 13-17, 20-24, 28, 30-31, 51, 55-58, 66-79, 81, and 86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fritzemeier et al. (U.S. Patent 6,022,832, hereafter '832) in view of Chen '813. (Cima et al. (U.S. Patent 5,231,074 is cited as evidence because it is incorporated by reference as giving details of the fluoroacetate method of '832.)

'832 teaches a method comprising:

disposing a precursor solution onto a surface of a layer to form a precursor film, the precursor film including, for example, yttrium trifluoroacetate, barium trifluoroacetate, and copper trifluoroacetate (col. 8, lines 45-53); and

treating the precursor film to form YBCO via an oxyfluoride intermediate (col. 3, lines 36-42).

'832 is discussed above, but does not explicitly teach the use of a copper salt other than the trifluoroacetate. However, '813 teaches that in combinations of precursors to make YBCO

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superconductors, the copper precursor may be copper ethylhexanoate with only enough copper TFA to add fluorine to the intermediate. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a copper salt such as copper ethylhexanoate in addition to or in replacement of the copper trifluoroacetate of '832 with the expectation of similar results and with the expectation of similar results because '813 teaches that such combinations are suitable copper precursors for forming YBCO superconductors.

Claims 2, 16, 56: '832 incorporates Cima '074 to explain the details of the process. The heating may occur for less than five hours (Fig. 1).

Claims 17, 51: '074 teaches that the solvent may be methanol (a Lewis base) (Example 1)

Claims 6, 20-23: The thickness may be 2-5 microns (col. 14, lines 19-22).

Claims 7, 58, 68: The critical current density is at least 10^5 A/cm² (Example 2 & col. 5, 6-10 of '009).

Claims 8, 25, 55, 57, 66-67: '832 is discussed above, and teaches that defects should be less than 1.5 microns in diameter (col. 14, lines 45-51), but does not explicitly teach that the defects comprise less than 10% or 20 % of the volume of the intermediate. However, '832 teaches that the number of defects should be minimized and that the size of the defects should be minimized (col. 14, lines 37-51). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have minimized the number and size of any defects (and thus the defect volume fraction) because '832 teaches that such defects are undesirable. Further, given the similarity of the processes and properties of the instant claims and prior art, both would have been expected to have similar defect concentrations. When a reference discloses the limitations of a claim except for a property, and the Examiner cannot determine if the reference inherently

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possesses that property (in this case, defect concentrations), the burden is shifted to Applicant/s, In re Fitzgerald 205 USPQ 594 and MPEP 2112.

Claim 69-71, 78-79, 81: '832 does not explicitly teach critical currents of at least 200 A/cm. However, the preferred range of critical current density (1-3 MA/cm²) and thickness (2-5 microns) yields critical currents of 200-1500 A/cm which overlaps the ranges of Applicants claims. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a critical current in this range because it results from using the preferred ranges of critical current density and thickness.

Double Patenting

8. The amendments in response to the rejections under this heading of the Previous Office Action are acknowledged and appreciated, and the Examiner withdraws the rejections.

Response to Arguments

9. Applicant's amendments and arguments filed 8-15-06 have been fully considered. The amendment regarding defect concentration is dealt with above, and will not be repeated for brevity.

Applicants appear to argue that the skilled artisan would NOT have been motivated to use copper ethylhexanoate because Cima teaches away from such precursors for superconductors. This is not persuasive because (1) Cima never states they are inoperable, only that to date of publication they don't work as well as sputtered, co-evaporated or laser ablated methods. Is not the method of the prior art set forth by Examiner "co-evaporation"? and (2) since the other

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precursors contain fluoride, there is no reason to believe the product would be duly impaired by the addition of copper ethylhexanoate.

Applicants argument that the Examiner cannot arbitrarily mix and match components of different precursor solutions of different ligand chemistries is to over simplify the processes of the prior art. Applicants are reminded that Mizuta states “**Any** metal compound may be used as long as it gives an oxide upon calcination” (emphasis added), and goes on to cite a width variety of examples ranging from organic and inorganic acids to organic alkoxides, chelates, and carboxylates”. When appropriately heated, the organics vaporize and ultimately leave at least the metal oxides of the precursors. The point is that there are a wide range of organic ligand-based metal precursors that successfully form similar products, and there is simply no reasoning to support the notion that a compatible mixture of different precursors would not itself produce similar results.

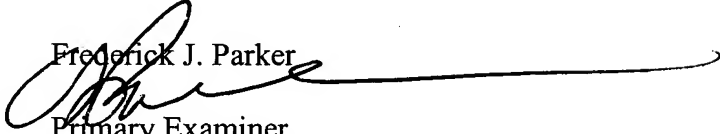
Applicants arguments and amendment are not convincing, and all claims are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frederick J. Parker whose telephone number is 571/ 272-1426. The examiner can normally be reached on Mon-Thur. 6:15am -3:45pm, and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Timothy Meeks can be reached on 571/272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Frederick J. Parker
Primary Examiner

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fjp